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INDUSTRIAL ORGANIZATION IN A RESTRUCTURING SOCIALIST ECONOMY: EVICENCE FROM BULGARIA

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Industrial Organization in a Restructuring Socialist Economy: Evidence from Bulgaria

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Abstract

Using new data for all state and cooperatively-owned Bulgarian establishments and enterprises in 1988 and 1989 we portray key aspects of Bulgarian industrial organization. During 1988-89: state ownership became less dominant; there was an abrupt reversal in the twenty year trend towards bigger economic units; more than half of the largest firms were concentrated in certain sectors, notably engineering and construction; using official prices, only about 10% of enterprises made losses. These data and other new data for manufacturing products enable calculation of diverse measures of market structure as this may evolve under the policies introduced in 1991. Indices of market concentration typically show substantial concentration; usually about one-third of manufacturing output is produced in potentially competitive environments. While estimates of minimum efficient scale imply that MES does not constitute a significant barrier to entry for new competitors, the underdeveloped nature of the Bulgarian capital market probably will greatly restrict entry.

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I. Introduction

As elsewhere in Eastern and Central Europe, in Bulgaria the extent of reliable economic knowledge with which to evaluate policies aimed at transforming Bulgaria into a western-type market economy is very thin. Thus while the need for more competition is proclaimed, estimates of the degree of concentration across specific markets are not available. Yet to evaluate both the success of actual reforms and/or the prospects for the success of proposed reforms, it is crucial to have more precise information.

The basic aim of this paper is to respond to these informational needs by using newly available data, covering all Bulgarian state- and cooperatively- owned firms and establishments for 1988 and 1989, to describe key aspects of industrial organization for the period immediately preceding recent reforms. Information of this scope and at this level certainly has not been previously available to researchers on Bulgaria; similar data have seldom been available to western scholars for any Eastern and Central European economy. These data and other new data for manufacturing products also enable us to offer a preliminary assessment of the likely effects of reforms since 1991, especially the new competition policy, on aspects of market structure. The plan of the paper is as follows.

In the next section, we briefly review policy and stylized facts for the period until the end of 1987. Next, we use the new data for 1988 and 1989 primarily to portray the changing nature of Bulgarian gigantism. Specifically we assembly information on the size and size distribution of forms and establishments by ownership (state and cooperative) and by industry. In addition we examine the extent of loss-making and the demography and characteristics of small and medium sized autonomous establishments.

In the penultimate section, we begin by describing relevant policy initiatives and proposals since 1991, especially the new competition policy. Our principal contribution is to construct estimates of the parameters of the new market structure as this may evolve under these policies. Measures include new indices of market concentration and use establishment level data and are based on low levels of product aggregation. We find that more than 90% of product groups are produced in either purely monopolistic, dominant firm or tightly oligopolistic conditions. However, one-third of manufacturing output is produced by establishments functioning in a potentially competitive environment. Estimates of capital outlay required to achieve minimum efficient scale do not imply that attaining MES constitutes a significant barrier to entry for new competitors. However, imperfections in the Bulgarian capital market probably mean that in the short term the necessary capital outlay will greatly restrict the likely level of entry, at least by firms owned by Bulgarians. Preliminary data for the size and scope of the private sector are consistent with this interpretation. In the concluding section, after summarizing our findings, we consider the implications of our findings on hypothetical market structure for other reforms.

II. Policy and Stylized Facts for the Period 1980-1987

The general features of policy concerning industrial organization (and the underlying rationale) in centrally planned socialist economies (CPEs), where state ownership has been the norm, is well known (e.g. Kornai, 1980). In such economies the creation of new firms was seen as the business of the state and performed largely by decree. Competition, both domestic and foreign, was viewed as engendering needless duplication of productive capacities and wasting resources. With prices

and output targets set centrally, firms did not face credible bankruptcy threats and even firms that systematically made losses were subsidized. While cooperative ownership was tolerated, state-ownership was the strongly preferred form and received the bulk of resources. A strong belief in technical and managerial economies of scale existed and mergers were sometimes encouraged in this pursuit of fostering large economic units. This policy leads to fairly predictable outcomes - for example, production entities in CPEs are expected to be both larger and less variable in average size than in capitalist economies (Eucken, 1948).

The available Bulgarian data tend to support this view, though there are, in fact, considerable gaps in the empirical record. Some information is available on size distribution for Bulgaria (Jones and Meurs, 1991). These data show that Bulgaria was no exception to the size distribution patterns observed in most CPEs (See Ehrlich, 1985). Reflecting a virtual absence of entry of new (and exit of old) firms during at least a twenty year period, the total number of Bulgarian firms did not change much. These data also show that Bulgarian industry increasingly suffered from gigantism. Thus, whereas in 1965 9.6% of establishments employed more than 5000 workers, by 1980 and 1987 the corresponding figures were 34.1% and 41.4% respectively.

As in many other CPEs, the "socialized" sector in Bulgaria has never been homogeneous but has had, as part of the socialized industrial sector, a cooperative sector alongside state-owned firms. These smaller firms have been prevented from effectively competing with state firms or meeting demand due to raw material supply problems. Despite the merging of large-scale cooperatives in the agricultural sector with state farms into Agro-Industrial Complexes in the 1970s, and the transformation of many industrial coops into state ownership during the 1970's, a significant number of relatively independent small and medium-sized

cooperative enterprises persisted into the 1980s. Thus while there were 645 industrial coops establishments in manufacturing in 1965 (representing 43% of industrial establishments), the absolute number of industrial coops fell to 181 in 1987, representing 7.7% of the total number of establishments in manufacturing.

The available data reveal the existence of foreign trade flows that indicate the limited nature of foreign trade competition. The economy was organized so that imports were concentrated in products which were not produced in Bulgaria. Data on import shares (Table 1) support this conclusion. In addition, data on bilateral flows show that in Bulgarian foreign trade typically there were not large amounts of homogeneous commodities moving in both directions. Thus the value of the Balassa index[1] for manufacturing in 1988 (using 84 industries) is 0.589. Similar estimates for Belgium, whose economy is comparable in size to that of Bulgaria, are 0.367 in 1972 and 0.375 in 1976 (Jacquemin et al. 1980).

While limited entry of new firms and restrictions on competition was widely believed to have led to market structures that were very concentrated, there do not appear to be any actual measures of the extent of this concentration. Similarly, while the essential features of policies concerning the scope and nature of subsidies before 1987 are probably quite similar in character to policies for other CPEs, the available data on the outcome of these policies - e.g. the extent of loss-making - are not very extensive or precise.

During the 1980s the sense grew that the high level and growing degree of concentration, and the increasing reliance on state ownership, at least coincided with the well-documented deterioration of the Bulgarian economy (Wyzan, 1990; Jones, 1991). Hence a series of reforms were initiated, especially Decrees 12, 33 and 56. The focus of these initiatives were provisions for the creation of new and small enterprises. While the partial and inconsistent nature of available

data make it difficult to evaluate the impact of the entry reforms since 1980, even for the period preceding Decree 56 all sources suggest some impact and most indicate a growing impact (Jones and Meurs, 1991). Thus the number of manufacturing establishments grew by 4% from 1986 to 1987, apparently the fastest rate for about 20 years. All of this growth took place in establishments which are state-owned-- the number of coops remained essentially unchanged at about 180 through the 1980's. Some of this growth represented the growth of smaller establishments with, as planned, the majority of these firms concentrated in consumer goods and high technology. While this represented a significant experiment, by the end of 1987 it probably had not involved more than 0.5-1% of the total labor force. Moreover, until the end of 1987, the creation of new, semi-independent sub-units within large enterprises has been a much more important element of the reform than the breakup of large state enterprises. At the same time, however, the importance of very large state establishments continued to be very great.

Apart from these limited measures, until 1987 there do not appear to have been any other significant changes in structural measures to facilitate more competition. Such changes as there were tended to be mainly organizational reforms designed largely to improve the government's control of the economy. In addition such policy initiatives were often reversed-- e.g. policies to encourage mergers were followed by policies promoting splitting up of firms. Also, in principle, the policies on subsidies were tightened. But in practice, as with other changes, these reforms did not amount to much.

In sum, the stylized facts are broadly as one would expect for key features of industrial organization in the era before perestroika. State ownership was dominant, most markets apparently were supplied by a few producers and huge firms were the norm. Importantly, however, precise

information on many of these matters has not been available. In the next section we provide more recent data on some of these matters for which data have been available (e.g. size distribution of establishments). More importantly perhaps, we attempt to plug some of the empirical gaps by providing data for the first time on some of these issues.

III. New Evidence on Structure of Bulgarian Enterprises

A. State-owned Firms and Establishments: Size and Size-Distribution

In Table 2 we assemble information on the size distribution of Bulgarian enterprises for 1989. From the data[2] it seems that by 1989 the trend towards increasing giantism not only had stopped but had been reversed. For one thing, only 474 firms employed 500 or more.[3] This compares with 487 firms employing more than 500 in 1988. That the number of very large economic entities ("firms") was falling is also shown by the fact that in 1989 only 13 firms (2.1% of total number of firms) had more than 20,000 employees. Or, as already noted, whereas in 1987 41.4% of firms employed more than 5000, by 1989 this percentage had been more than halved. Another way of examining this trend is to look at the other end of the size distribution. The data show that the number of small firms was increasing. However, in terms of overall impact, the number of small firms was still limited. Moreover, most of this entry reflected the reorganization of existing firms rather than the entry of new production units.

The issue of size distribution can also be examined using establishment-level data. The data in Table 3 clearly show that there were a large number of very large establishments and relatively few small plants. For all industries, in 1989 out of a population of 4198 establishments, 33 establishments each employed more than 5000 workers, 1152 employed more than 500 while only 897 employed fewer than 100. In

manufacturing the comparable figures for a population of 2327 establishments are 23 (1.0%), 736 (31.6%) and 424 (18.2%). Importantly, however, comparisons with similar data for manufacturing establishments for earlier years (Jones and Meurs, 1991) show that already significant changes had begun. Thus in 1987 for manufacturing establishments, less than 2% (41/2140) employed fewer than 100 and more than 41% (883/2140) employed more than 5000.

In Table 4 we present data which enable us to examine the extent of multi-establishment activities amongst Bulgarian firms. From it we see that the average firm has about 7 establishments (4198/606). But the modal class of firm has only a single establishment. Only one firm has more than 100 establishments and only 27 (representing about 4.5% of firms) have more than 25 plants.

In sum in terms of average size and size distribution it seems that by 1989 the extent of giantism in average firm and establishment size was already significantly diminishing. Despite these considerable changes, however, many large firms and establishments continued to exist. As such these data provide support for Eucken's predictions (1948) and reaffirm earlier findings for Bulgaria (e.g. Pryor, 1973; Jones and Meurs, 1991). By international standards, the Bulgarian size distribution of firms continues to be unusual in two respects (though comparable to data available for other countries in Eastern and Central Europe). First it remains tilted decisively in the direction of huge production entities.[4] Second, small firms remain woefully under-represented in the Bulgarian size distribution of firms - the socialist "red-hole" still remains (Vahcic, 1990).[5] This suggests that both firms and establishments were much bigger than optimal scale and that, in turn, as market forces begin to take hold, even in those activities that are economically viable, considerable labor shedding will be needed.[6]

B. Cooperatives: Size and Structure

To see whether or not the declared aim of diversifying the ownership structure of the economy was being realized, at least as far as the firms responsible for 95% of production are concerned, we examine data on cooperatives. Our data on coops consist of establishment level data and data on regional groupings - i.e. supra enterprise organizations of coops. Establishment level data are more indicative of genuine differences in legal form. At this level there is evidence of a sharp growth in the importance of cooperatives. While in 1987 there were only 187 coop establishments in manufacturing, by 1989 the number had grown to 566. As such this meant that coops accounted for 11.4% of all establishments (compared to 7.7% in 1987). Overall 959/5157 (more than 18%) of all establishments were coops.[7]

From Table 5 we also see that the size distribution for cooperative establishments is tilted more towards smaller establishments than is the size distribution for all establishments. Thus there are no coop establishments with 5000 or more employees. Also, while 73% of coop establishments employed 300 or fewer workers, for all establishments this was the case in only 58% of cases.

C. Branch Distinctions

To see where average size is greatest (and presumably the potential for labor shedding also greatest, on average) we investigate in which industries the biggest firms are located, and whether this has changed much in 1989 (compared to 1988). In Table 6 we therefore assemble information on the industrial distribution of the (approximately 100)[8] largest firms in Bulgaria in 1989. Three indicators of size are used, employment, sales and value added, and comparisons are made with 1988. We find that, within this group, ranking is not very sensitive to the

use of a particular size indicator; whether size is measured by employment, sales or value added, roughly 70 of the top 100 firms are in manufacturing (and the balance in non-manufacturing). Most large firms (more than 20) are in mechanical engineering. About 10 of the largest Bulgarian firms are also found in each of the following sectors: electrical engineering (including electronics); chemical and oil refining; food; and construction. Also worthy of note is that there are many sectors in which there are no firms belonging to this Bulgarian top 100 - e.g., glass and pottery, agriculture, urban transport and hotels.

D. Subsidies and Loss Making[9]

In Table 7 we present the distribution by industrial branch for those Bulgarian enterprises that in 1988 and 1989, and on the basis of official prices, earned negative "profits" before taxes and subsidies (i.e. the distributions are based on "gross profit" figures). The data are arranged separately for manufacturing and non-manufacturing. Using these data the following observations are apparent. First, the number of loss-making firms is rather small, 43 in manufacturing and 14 in non-manufacturing in 1988, and 39 in manufacturing and 15 non-manufacturing in 1989. For 1988 this is less than 12% of the 351 manufacturing firms and 6% of the 265 non-manufacturing firms. Second, loss makers are concentrated in particular activities. Most noticeably, 14/39 firms in the "Building Materials" industry were loss-making firms. Third, while in some industries the actual number of loss makers is not excessive, the percentage of firms for that industry which is comprised of loss-making firms may be high. For example, four of the five firms in the ferrous-metallurgical industry are loss makers, while the coal industry is completely comprised of loss-making firms. More than half of the firms in the Electrical and Thermal Industry and in the Non-ferrous metallurgical industry, as well as three-quarters of the

Urban Transport Industry are also loss makers. At the same time, while 14 loss makers are in building materials, this represents "only" 32% of firms in that industry. Finally, the data show that the patterns of loss making did not change much from 1988 to 1989. However, there was a slight increase in the number of losers in the non-ferrous, mechanical engineering and construction industries, while there was a slight improvement in the logging, glass, and pottery, wearing-apparel, leather and footwear, and public services industries.

Some of these results, such as the apparent limited extent of loss-making, are perhaps surprising to those who expect to find more dramatic evidence of rampant inefficiencies in enterprise operation. However, when information is available for other CPEs, the findings are perhaps, even more surprisingly similar, in view of their very different experiences with economic reforms. For example, in Poland, 11% of the largest firms were found to be loss makers in 1988 (Shaffer, 1990). Also, the pattern of persistent industrial concentration for loss-makers in Bulgaria has been found elsewhere, (though the particular distribution of loss makers is usually very different). Thus, in Poland, 43/56 loss makers were found in food processing (Shaffer, 1990).

In terms of the logic of a centrally administered economy perhaps this is not so surprising. Centrally set prices tend to reflect prime/production costs. Hence it is natural during this era to find both few loss makers and loss makers concentrated in basic industries. Their prices represent costs to many other firms and to revise them would lead to prices needing to be adjusted elsewhere. In other words, the consequence of this inertia is for loss making at the beginning of the chain. In turn losses were met by growing subsidies (rather than by higher prices).

E. The Demography Characteristics and Performance of Small and Medium Sized Autonomous Establishments, 1987-1989.

In our previous discussion of establishments (e.g. Tables 3 and 5) we did not distinguish autonomous[10] establishments from those which were parts of state or cooperatively owned firms. Hence in Table 8 we present information showing the rising importance of small (labor force below 50) and medium (labor force greater than 50 and less than 200) sized autonomous establishments during 1988 and 1989. These data reaffirm earlier findings (e.g. McIntyre, 1988) that already the process of breaking up of some enterprises within the socialized sector had begun. However, this was still on a fairly limited scale.[11] Moreover the data show (as Jones and Meurs, (1991) note), that cooperatives comprised a major share of this autonomous sector, though municipal establishments were also important. In 1989, the three main industries in which autonomous establishments appeared were domestic trade, construction and mechanical engineering.

In Table 9 we present various partial indicators, usually on firm performance. Relative to all firms (i.e. including large), for all indicators these data show small and medium sized firms often were quite effective. However these indicators have well-known shortcomings. A broader range of data is needed to examine for the possible effects of size on establishment performance.

IV. Evidence on Potential Bulgarian Market Structures

In the bulk of this section we provide calculations of various parameters of market structure for the existing manufacturing sector. This is followed by a brief discussion of the scope and nature of the new private sector. As prelude, we first briefly discuss the new policy environment.

Price liberalization began in February 1991 when the system of central price fixing was overturned. With some important exceptions, all producer and consumer prices were liberalized. The other key change began earlier in late 1990 with the start of a new-competition policy. Major structural reforms began as some horizontally organized firms in the food industry were split and their regional subsidies were given economic and legal independence. In March 1991 a large-scale de-monopolization process was initiated, affecting industries including textile, shoes, mechanical engineering, and wholesale and retail trade. Consequently this means that the size distribution of firms (though, and importantly, not necessarily for establishments) will have been dramatically changed.

The key fear for reformers when such reforms proceed simultaneously is that newly independent firms will begin to exploit monopoly power.[12] Previously this possibility was avoided both by price controls and structures that denied enterprise managers autonomy and residual claimancy status. In the new environment of free prices, the existence of autonomous firms managed by independent agents permits the possibility of rent-seeking behavior to exploit situations where monopoly power is strong. This is especially a danger in the short run (say the next two-three years) when entry of newly created and sufficiently large and efficient domestic firms from the private sector likely will be slow and the extent of foreign competition also will probably remain modest. To determine the likely scope and extent for this potential rent-seeking behavior, we construct measures of market structure in the new environment. The key assumption underlying our calculations is that, in the new environment of free prices and in which many firms have been split-up, we can reasonably expect that what are currently individual establishments in our data base will begin to behave as independent entities. Hence by matching our establishment

level data with data for individual product markets we construct measures of the "new market structure".

By proceeding in this way, we make important assumptions. The first is a response to the problem of defining the domestic market, especially as affected by the volume of international trade flows. In this study our estimates are generated after accounting for only some aspects of exports and imports. In most cases, therefore, we assume (following Petranov, 1991) that it is the volume of production which accurately proxies the likely state of market structures. Not only do we essentially ignore international trade, but in addition, we proceed as though all markets were national. However it is clear that transport costs are substantial for a number of product groups; these markets are actually confined to smaller regions. Other things equal, this procedure tends to lead to an underestimation of the degree of concentration, though hardly to an extent which could markedly affect the general estimates. Finally, we assume no entry.

To generate calculations of various parameters of market structure, we use data on Bulgarian manufacturing for 1989.[13] Using Bulgarian categories (see Appendix) the data were chiefly from the third level of disaggregation; this includes 1049 product groups with a 7-digit code. Parallel calculations were made in certain cases with data from the second level of disaggregation, including 102 industries with a 4-digit code. In terms of the US classification, these levels can approximately be compared with the 4-digit industries (or closer with the 5-digit industries in some sectors) and the 3-digit industries, respectively.

The 7-digit industries data (for product groups) suggest a relatively differentiated market, even though the major industry groups seem to be treated in a different way. Thus, the chemical and

oil processing industries are divided into 284 product groups, while for the apparel industry there are only 3 divisions.[14]

Table 10 presents one way of describing market structure, data on the distribution of market shares. To see whether the picture that emerges is sensitive to different levels of aggregation we provide data for 7- and 4-digit industry levels. Calculations show that differences between the distributions of shares for the two levels of aggregation are significant. In our discussions, reflecting the arguments already mentioned, attention is chiefly focused on data for the 7-digit industries (product groups).

The picture that emerges seems to indicate a relatively low extent of monopolization. Over 75% of shares (5951/7769) are below 0.1 which apparently suggests that most enterprises do not have the potential to exercise market power. However, further examination of these data reveals considerable differences among the major industry groups. While in the case of the wearing apparel industry the share is 100%, its value for industry groups such as chemicals, electronics and electrical engineering is about 40%.

While the data on share distribution do not provide a precise measure of the degree to which a certain market is monopolized, they do give an idea of when it might be expected that specific industries will be dominated by particular producers. On the other hand, when there is a larger number of producers with a small share of the market, this suggests the existence of potential competition. In turn, and under appropriate circumstances, this could be expected to have favorable effects and lead to the emergence of effective competition.

The question also arises of whether within a centrally-planned economy it was possible for large enterprises to abuse their monopoly position. Since prices were centrally set, the standard approach (e.g. the Structure-Conduct-Performance paradigm) is expected to be

inappropriate. Indeed, in unreported regressions, we find no statistically significant relationship between profitability and market share and/or concentration.[15]

Fortunately data on the number of producers of similar products are available. These data give a better idea of the number of monopolized markets. According to the data included in Table 11, 430 product groups have only one producer. At the same time the groups where one might be sure to expect competition - over 20 producers - amount to only 93.

In addition, data are available to calculate standard indices of market concentration - the concentration ratio of the biggest 3 and 4 producers, the Herfindahl-Hirschman index and the standardized entropy index.[16] The data for 7-digit product groups are presented in Table 12. These data also show very high levels of concentration.

To make a general estimate of the degree of concentration in manufacturing, individual product groups were weighted according to the volume of output; the data are reported in Table 13. They show that if a strict criterion for competition regarding concentration is applied (value of HHI up to 0.2), only about 45% of manufacturing output is produced in sectors where competition among Bulgarian enterprises might be expected. About 10% of the output is produced by pure monopolies.

Of course concentration is only one of the parameters of market structure, and alone it is not sufficient to provide a final estimate of the degree of competition. Nevertheless, standard categories can be applied to data for Bulgarian manufacturing to determine the nature of the various markets. We apply the following categorization (derived from Shepherd, 1985):

pure monopoly - coefficient of concentration (CR3)=1;

dominant firm - the biggest producer has a share larger than 0.5 and at least twice as large as the second biggest producer;

tight oligopoly - CR3 is higher or equal to 0.5;

loose oligopoly - CR3 is lower than 0.5 and higher than 0.1;

monopolistic competition - CR3 is smaller than 0.1 and the number of producers is less than 30;

pure competition - CR3 is smaller than 0.1 and the number of producers is higher than 30.

The results of applying this classification of product groups and the respective output of Bulgarian manufacturing for 1989 are presented in Table 14. Referring to this table, suppose we assume that markets (product groups) which are classified as either loose oligopoly, monopolistic competition or pure competition are effectively competitive. Then only 79 product groups (7.6% of the overall number) would be assessed as potentially effectively competitive. However, the volume of the output produced in these markets amounts to 34.4% of overall manufacturing output. In turn this implies that almost 2/3 of output is being produced by firms having the potential to exercise market power.

Since the effects of international trade and potential competition are not taken into account, these estimates are somewhat biased upwards. At the same time, the fact that markets are defined as national, (when we know that for some product groups transportation costs confine them to regional markets), indicates that these are underestimates of the sector comprising pure monopolies, dominant firms and tight monopolies. In addition, the available data mean that we are unable to consider other potentially important factors, especially the role of changes in the structure of prices since 1989.

Following Bain (1956) the chief factors determining the extent of barriers to entry are: economies of scale; absolute unit cost advantages; capital cost requirements; and the advantages of product

differentiation. We continue by reporting the results of the first attempt to obtain empirical estimates of potential barriers to entry for the Bulgarian economy.

To estimate empirical estimates of minimum efficient scales (MES) (and the likely impact of the possibility for entry on the conduct of enterprises) it proved impossible to adopt methods involving obtaining "engineering estimates" (Bain, 1956) or applying "survival techniques" (Stigler, 1985) to product groups; however, a third approach is feasible. This approach is based on the distribution of enterprises' sizes and requires using the data on manufacturing output for 1989 at the level of 7-digit product groups. We use two methods to estimate MES: (i) the size of the smallest establishment among the largest establishments accounting for 50% of shipments; and (ii) their average size. One limitation of this approach is that it was applied to structures formed largely under market conditions, while in Bulgaria decisions for industry development were based on other considerations. Consequently, the resulting estimates must be regarded as tentative and should be used with caution.

In Table 15 this approach is applied to obtain estimates of capital outlays required for establishing an enterprise with MES. These estimates indicate that most product groups would require relatively small capital outlays.[17] This might be expected to create favorable conditions for the entry of new producers and to limit the exercise of monopoly power by existing producers. However, when the underdeveloped Bulgarian capital market is taken into account, it might be expected that, in the short term, even apparently modest capital requirements will constitute a sizable barrier to entry.[18]

Unfortunately, even preliminary calculations on the impact of product differentiation as a barrier to entry could not be made -- data were not available. However, as the study draws on a rather low level of

product aggregation, it might be supposed that the effects not accounted for by this omission are insubstantial. Similar arguments apply concerning factors such as the limited extent of the Bulgarian market and the lack of consumer aspirations for products from established enterprises.

We conclude this section by briefly noting findings from other studies on the scope and nature of the private sector as it has evolved in the period both before and immediately after the major policy changes of 1991. These show a private sector: (i) that overwhelmingly consists of tiny enterprises - the legal form of individually owned enterprises accounts for more that 70% of all registered forms (Anachkova et al., 1992); (ii) in which average assets for even the larger private firms apparently are small relative to the average firm in the socialized sector.[19] As such these preliminary data, while of course not conclusive, are consistent with our interpretation that sizable barriers to entry exist in the Bulgarian economy.

V. Conclusions

New data for all state and cooperatively-owned Bulgarian establishments and enterprises in 1988 and 1989 and manufacturing products in 1989 are used to portray key aspects of Bulgarian industrial organization as it was before the introduction of reforms in 1991 and, more importantly, as it may evolve under these new policies. We find that during 1988-89 state ownership became less dominant as the number of cooperative establishments grew by 65%. There was an abrupt reversal in the twenty year trend towards bigger economic units which was reflected in a major change in the size distribution of establishments. More than half of the largest Bulgarian firms were concentrated in certain sectors, notably engineering and construction. Using official

prices, only about 10% of enterprises made losses. Comparisons with evidence for experiences elsewhere reveals important similarities in some of these respects. These findings show that while by 1989 some modest changes were already underway in the Bulgarian economy, in fundamental respects, such as market structure, basic and rapid acceleration in the extent of structural reform was needed.

By integrating these establishment-level data with other new data for manufacturing products we also construct various measures of market structure as this may evolve under the new regime following the new competition policy. Typically these estimates show market structure to be heavily concentrated, though, by some measures, at least one-third of manufacturing output is produced by establishments in potentially competitive environments. Estimates of MES together with the underdeveloped nature of the Bulgarian capital market suggest that there will be limited entry of new firms in the short term.

In important ways, therefore, it seems that the historical conditions serve to constrain the possibilities for and potential of rapid reform, especially concerning privatization. Despite the beginnings of the emergence of a private sector (Jones and Meurs, 1991; Anachkova, et al. 1991), new small firms are being created at a rate which, in the aggregate, is making only a small dent in terms of overall employment and economic activity. Thus what were large state owned firms will still dominate the economy, albeit as independent smaller firms. A key issue is how managers of these "bust-up" firms will respond to the changed economic environment. While many analysts (e.g. Blanchard et al., 1991) assume that firms will respond to the altered incentives and quickly become profit maximizers, partly because of the fantastic uncertainty confronting all economic agents within Bulgarian firms, more complicated response are much likelier. As some have argued (e.g. Nelson and Winter, 1982, Murrell, 1992), for diverse reasons most

organizations are likely only to adapt their objectives slowly and perhaps even to sequence the focus on different objectives (Day and Singh, 1977). In a rapidly deteriorating economic environment a large potential exists, in the short run at least, for autonomous managers to exploit monopoly power and seek rents.

Potentially an important factor for diminishing the adverse effect of monopoly power is the influence of the international market, which was not extensively examined in the study. Also, our analysis does not take into account possible developments in government policy toward abuse of monopoly power and the regulation of natural monopoly. Our estimates show that industries typically regarded as natural monopolies are characterized by high market concentration and high barriers to entry. Government regulation would be especially expected to decrease the negative effects of market failures, in such cases, though such agencies might be subject to extraordinary political pressures.

Our analysis implies that for the foreseeable future, the state sector will continue to dominate. This, as well as experience elsewhere, in particular Poland and Hungary, where more radical economic reform has been underway for far longer than in Bulgaria, suggests that transforming large state-owned firms into privately-owned firms is likely to be a more long-drawn out process than some suggest is feasible. In turn, this means that the nature of and policies concerning state firms, in particular ways and means of providing incentives for top managers of such concerns not to focus on exploiting monopoly power, are likely to be crucial to the success of overall economic reforms.

APPENDIX

All data were obtained from the records of the Central Statistical Office of Bulgaria.

A. DATA ON FIRMS AND ESTABLISHMENTS

1. The data are for 1988 and 1989.

2. The data set contains all (6116) state-owned and cooperative establishments, and all (626) firms, as well as other organizational units. No data on private firms are included.

3. Some establishments with a specific subject of activity, which are not part of a certain firm, are grouped as to the economic sector they operate in.

4. Data about firms have been obtained through the summation of data about plants belonging to the respective firm. This means that for some indicators the value reported may be smaller than the true one. Thus, the reported number of personnel does not include those engaged in the head office of the firm.

5. Some firm subsidiaries do not function as economically independent enterprises, and have, therefore, reported only some indicators - mainly the number of employed and the sums paid for wages and salaries.

B. DATA ON MANUFACTURING INDUSTRIES AND PRODUCTS

1. The data are for 1989.

2. Data are sorted along the industry (product) as a primary criterion and the relevant establishments as a secondary one.

3. The industry (product) code contains information about seven levels of aggregation, in agreement with the current Bulgarian classification. The code used employs 14 digits. The code has the following organization:
   - the first two digits refer to an industry;
   - the third and fourth - a subindustry;
   - the fifth, sixth and seventh - a product group;
   - the eighth and ninth - a subgroup;
   - the tenth - a sub-subgroup;
   - the eleventh and twelfth - a representative commodity;
   - the thirteenth and fourteenth - given commodity.

4. For various industries (products) disaggregation reaches a different level. The value indicated for the respective level of aggregation does not always disaggregate entirely on the lower level.

5. The data-base comprises data for:
   - 18 industries on the first level (2-digit);

- 102 subindustries on the second level (4-digit);
- 1049 product groups on the third level (7-digit);

C. DEFINITION AND NOTES OF INDICATORS

Value added - comprises expenditures for salaries, bonuses, social insurance and profits before taxation. This differs from the generally accepted use in that it does not include depreciation.

Gross profit - comprises turnover tax, excise, rent, and other profits and losses.

Employment - the average annual number of employees.

Productive assets - includes average productive assets at acquisition, i.e. the undepreciated value, excluding the land and working capital.

Notes

1 The Balassa index is:

$$(1/n)\sum_{j=1}^{n}(X_j-M_j)/(X_j+M \qquad j = 1 \ldots n,$$

where X_j is the export of industry j,
M_j is the import of production pertaining to industry j,
n is the number of industries.

2 For details of the data see the appendix.

3 While our data do not include all Bulgarian firms (see Appendix), they do cover firms producing more than 95% of the GNP in 1988-1989. Typically, omitted firms are small and in the private sector.

4 See Ehrlich (1985) and Sziracski (1991).

5 Because of their small average size, this is true even if we include newly registered firms under Decree 56.

6 For preliminary estimates of the scale of this during 1991 see Jones (1991) and Planecon (1991).

7 Data for firms registered under Decree 56 also show growth of cooperative ownership. In addition, primarily reflecting the growth of a private sector, those data reveal a broadening of ownership forms. (See Jones and Meurs, 1991).

8 Depending on the indicator used and the year, the number of large firms varies from 93 to 102.

9 In so doing we emulate the method of researchers such as Schaffer (1990), who have argued that notwithstanding our limited knowledge of pricing and accounting practices, such procedures are instructive.

10 Autonomous is defined as a legal entity under Decrees 33 and 56. See Parvulov (1992).

11 For example, the number of extraordinarily large firms continued to grow. (See Jones and Meurs, 1991). Also, in 1989 production in small and medium sized firms accounted for only 6.4% of total production, though the corresponding figures for value added and employment were larger - 8.5% and 9.3% respectively.

12 Kroll (1991) provides an informative account of this debate in the USSR.

13 See the appendix for a description of the data source.

14 Some of these differences, however, can be partially explained by differences in the elasticity of substitution of the relevant product both in consumption and in production of the respective items. In cases where estimates require information which is not contained in the main data base, we use Leontieff's input-output table of the Bulgarian economy for 1988, which contains 84 industries. The relationship between "input-output" industries and 4-digit industries in the main data base is direct and the study frequently resorts to one or the other.

15 These are available upon request from the authors. But note the regression reported in footnote 18.

16 All of the indices proposed for measuring concentration have various shortcomings. Hannah and Kay (1977) propose a system of axioms that should be satisfied by the indices; all use market shares of firms as a measure of their relative significance.

One of the indices most frequently employed is the concentration ratio of K firms, defined as the cumulative share of the k-th firm.

$$CRK=\sum_{i=1}^{K} S_i$$

i = 1 ... K and S_i is the share of the i-th firm.

The Herfindahl-Hirschman index:

$$HHI=\sum_{i=1}^{N} S_i^2$$

i = 1 ...N and N is the number of firms.

Unlike the concentration ratio depends of the shares of all firms. The squares denote the greater weight of bigger firms.

The indices for measuring the concentration could also be based on the concept of entropy. The simplest entropy index

$$E=\sum_{i=1}^{N} S_i \log S_i$$

i = 1...N

acquires a maximum value of log N when the shares of firms are equal. If the firm is only one - another boundary case - the value of E is 0.

17 Of course factors that such as monetary policy, and the extent of foreign capital flows will affect the significance of this factor. Also it must be emphasized that the calculations were made using centrally-fixed prices (i.e. when asset prices seldom bore a close relationship to market prices).

18 To examine this and related points further we estimate multiple regressions in which profitability is the dependent variable and its relationship with MES, capital assets (ASSETS) and concentration (the Herfindahl-Hirschman index, [HH1]) is examined. Profitability is measured by either profit on sales (RRS) or profit on productive assets (RRA). Minimum efficient scale is proxied either as the smallest plant from the group of establishments that produces 50% of production (MES5OR) or the average of this top 50% of establishments (MESAVR). Using data from data base A, all regressions reject the hypothesis that there is a statistically significant relationship between either MES or capital assets, and profitability (or between concentration and profitability).

A representative result (with RRS as the dependant variable and standard errors in parentheses) is:

	CONSTANT	HHI	MESAVR	ASSETS
RRS =	11.229	158.288	-156.799	3.218E-06
	(29.946)	(137.412)	(145.859)	(5.848E-05)

19 See Jones and Parvulov, forthcoming.

Table 1

Distribution of Product Groups
According to Imports' Share in Consumption

Industries	Imports' Share in Consumption (%)					Total
	0	1-33	34-66	67-99	100	
Metallurgy	11 (11.2)	16 (16.3)	11 (11.2)	12 (12.2)	48 (49.0)	98 (100.0)
Chemical and Oil Refining	59 (25.8)	36 (15.7)	5 (2.2)	18 (7.9)	111 (48.5)	229 (100.0)
Mechanical Engineering	16 (22.2)	25 (34.7)	2 (2.8)	0 (0.0)	29 (40.3)	72 (100.0)
Building Materials	21 (84.0)	4 (16.0)	0 (0.0)	0 (0.0)	0 (0.0)	25 (100.0)

Note: The brackets contain the share with respect to the overall number of product groups in the respective industry.

Source: Data base of NC "Infoma"

Table 2
Size Distribution of Bulgarian
State-Owned Enterprises in 1989
(By Number of Employees)

Employees	Enterprises			
	All Industries		Manufacturing Only	
	#	%	#	%
Above 20,000	13	2.1	8	2.3
10,001 - 20,000	37	6.1	30	8.7
5,001 - 10,000	55	9.1	37	10.8
1,001 - 5,000	254	41.9	154	44.8
500 - 1,000	115	19.0	60	17.4
200 - 500	78	12.9	38	11.0
Up to 200	54	8.9	17	4.9
Total	606	100.0	344	100.0

Source: Authors' data base A (See Appendix).

Table 3
Size Distribution of Bulgarian
State-Owned Establishments in 1989
(By Number of Employees)

Employees	Establishments			
	All Industries		Manufacturing Only	
	#	%	#	%
Above 5,000	33	0.8	23	1.0
1,001 - 5,000	489	11.6	327	14.1
501 - 1,000	630	15.0	386	16.6
301 - 500	751	17.9	418	18.0
100 - 300	1,380	32.6	743	31.9
Up to 100	897	21.4	424	18.2
NA	18	0.4	6	0.3
Total	4,198	100.0	2,327	100.0

Source: Authors' data base A (See Appendix).

Table 4
Size Distribution of the Number of
Establishments Per Enterprise in the State Sector

	#	%
Above 100	1	0.2
26 - 100	26	4.3
17 - 25	26	4.3
11 - 16	49	8.1
6 - 10	68	11.2
2 - 5	131	21.6
1	305	50.3
Total	606	100.0

Source: Authors' data base A (See Appendix).

Table 5
Size Distribution of Bulgarian
Coop Establishments in 1989
(By Number of Employees)

Employees	Establishments			
	All Industries		Manufacturing Only	
	#	%	#	%
Above 5,000	0	0.0	0	0.0
1,001 - 5,000	19	2.0	17	5.7
501 - 1,000	91	9.5	40	13.3
301 - 500	148	15.4	60	20.0
100 - 300	432	45.0	134	44.7
Up to 100	267	27.8	49	16.3
NA	2	0.2	0	0.0
Total	959	100.0	300	100.0

Source: Authors' data base A (See Appendix).

Table 6

Distribution of the Largest Bulgarian Firms - 1989 and 1988
(Size of Firms is Measured by Employment, Sales and Value Added)

Industry	Employment		Sales		Value Added	
	1989	1988	1989	1988	1989	1988
A. MANUFACTURING						
Electric and Thermal	3	3	3	3	1	1
Coal Industry	2	2	0	0	0	0
Ferrous Metallurgy	2	2	0	0	0	1
Non-ferrous Metallurgy	2	2	3	3	3	3
Mechanical Engineering	22	21	23	24	22	23
Electrical and Electronic	8	8	10	9	9	10
Chemical and Oil Refining	8	9	12	11	8	8
Building Materials	0	0	0	0	1	0
Logging and Woodwork	2	1	2	2	0	0
Paper and Wood-pulp	1	1	1	1	1	1
Glass and Pottery	0	0	0	0	0	0
Textiles and Knitwear	6	6	6	6	6	5
Wearing-apparel	1	1	1	1	1	1
Leather, Fur and Footwear	2	2	2	2	2	2
Printing and Publishing	1	1	1	1	1	2
Food Industry	10	10	14	14	13	12
Other Manufacturing	2	2	2	2	3	3
B. NON-MANUFACTURING						
Construction	10	11	7	9	11	11
Prospecting and Drilling	1	1	1	1	1	1
Planning and Surveying	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0
Motor Transport	4	1	1	1	3	3
Water Transport	1	1	1	1	1	1
Air Transport	1	1	1	1	1	1
Urban Transport	0	0	0	0	0	0
Other Transport	0	0	0	0	0	0
Communication	1	1	1	1	1	1
Domestic Trade	7	4	4	4	8	8
Material Supply	2	2	2	2	3	3
State procur't Agric	0	0	0	0	0	0
Technical Planning	0	0	0	0	0	0
Software Industry	0	0	0	0	0	0
Data Processing	0	0	0	0	0	0
Other Material Activities	1	0	0	0	1	1
Public Utilities	0	0	0	0	0	0
Hotel-type Services	0	0	0	0	0	0
Public Amenities	0	0	0	0	0	0
Scientific Research	0	0	0	0	0	0
C. Total	100	93	98	99	101	102

Source: Authors' data base A (See Appendix).

Table 7

Loss Making Enterprises in Bulgaria - 1989 and 1988

Industry	Total # of Firms	1988 Losers	% of Total	1989 Losers	% of Total
A. MANUFACTURING					
Electric and Thermal	8	4	50.0	4	50.0
Coal Industry	3	3	100.0	3	100.0
Ferrous Metallurgy	5	4	80.0	4	80.0
Non-ferrous Metallurgy	6	4	66.7	5	83.3
Mechanical Engineering	86	4	4.7	5	5.8
Electrical and Electronic	34	0	0.0	0	0.0
Chemical and Oil Refining	22	2	9.1	2	9.1
Building Materials	44	14	31.8	14	31.8
Logging and Woodwork	34	1	2.9	0	0.0
Paper and Wood-pulp	1	0	0.0	0	0.0
Glass and Pottery	12	2	16.7	0	0.0
Textiles and Knitwear	35	0	0.0	0	0.0
Wearing-apparel	13	1	7.7	0	0.0
Leather, Fur and Footwear	13	3	23.1	1	7.7
Printing and Publishing	3	0	0.0	0	0.0
Food Industry	19	1	5.3	1	5.3
Other Manufacturing	13	0	0.0	0	0.0
B. NON-MANUFACTURING					
Construction	79	7	8.9	8	10.1
Prospecting and Drilling	1	0	0.0	0	0.0
Planning and Surveying	12	0	0.0	0	0.0
Agriculture	2	0	0.0	0	0.0
Motor Transport	70	0	0.0	1	1.4
Water Transport	2	0	0.0	0	0.0
Air Transport	1	0	0.0	0	0.0
Urban Transport	8	6	75.0	6	75.0
Other Transport	2	0	0.0	0	0.0
Communication	1	0	0.0	0	0.0
Domestic Trade	33	0	0.0	0	0.0
Material Supply	9	0	0.0	0	0.0
State procur't Agric	2	0	0.0	0	0.0
Software and Data Processing	18	0	0.0	0	0.0
Public Services	8	1	12.5	0	0.0
Scientific Research	17	0	0.0	0	0.0

Note: For Part A, data are for 351 manufacturing enterprises.
For Part B, data are for 265 non-manufacturing enterprises.

Source: Authors' data base A (See Appendix).

Table 8

Autonomous Small and Medium Sized Establishments, 1988-1989

	1988				1989			
	State	Coop.	Municpl.	Total	State	Coop.	Muncpl.	Total
Small	7	80	41	128	9	93	57	159
Medium	23	306	291	620	28	338	318	684
Total	30	386	332	784	37	431	375	843

Source: Authors' data base A (See Appendix).

Note: Small is labor force ≤ 50; medium is labor force ≥ 50 < 200.

Table 9

Partial Productivity Indicators of the Performance of Autonomous Small and Medium Sized Establishments Relative to all Enterprises

	1988			1989		
	Small	Medium	Sm. & Med.	Small	Medium	Sm. & Med.
Average Annual Wage	113.2	99.1	99.9	101.1	97.3	97.5
Value Added/Sales	133.1	128.8	129.1	120.0	129.5	128.8
Material Costs/Sales	90.3	86.8	87.0	92.4	85.4	85.9
Gross Profit/Sales	129.4	120.2	120.8	125.0	121.5	121.7
Gross Profit/ Productive Assets	140.2	112.0	113.5	145.9	111.0	113.0

Source: Authors' data base A (See Appendix).

Note: All entries are indices (where the base is all firms = 100).

Table 10
Distribution of Market Share

Market Share	7-digit Product Groups	4-digit Industries
≤ 0.1	5951	7893
> 0.1 ≤ 0.4	909	168
> 0.4 ≤ 0.7	281	19
> 0.7 ≤ 1.0	628	13

Source: Authors' data base B (See Appendix).

Table 11

Distribution of Product Groups
According to the Number of Enterprises

Number of Enterprises	Number of Product Groups
1	430
2-10	462
11-20	64
21-30	41
31-40	13
41-50	15
above 50	24

Source: Authors' data base B (See Appendix).

Table 12

Distribution of Product Groups
According to the Degree of Concentration

	CR3	CR4	HHI	1-E/logN
up to 0.1	2	2	61	101
- 0.2	8	2	72	121
- 0.3	18	11	64	110
- 0.4	28	24	71	94
- 0.5	23	18	75	54
- 0.6	27	23	104	38
- 0.7	33	27	41	23
- 0.8	41	29	24	34
- 0.9	59	46	43	23
- 1.0	810	867	489	451

Source: Authors' data base B (See Appendix).
Note: CR3 and CR4 are concentration ratios for the 3 and 4 producers, respectively.
HHI is the Herfindahl-Hirschman index.
1-E/logN is the standardized entropy index.

Table 13
Distribution of Output
According to the Degree of Concentration

	HHI		1-E/logN	
	Mln Levs	%	Mln Levs	%
up to 0.1	13613	30.5	6739	15.1
- 0.2	5901	13.2	8893	19.9
- 0.3	5096	11.4	8127	18.2
- 0.4	2788	6.2	5151	11.5
- 0.5	2780	6.2	4654	10.4
- 0.6	4399	9.8	2366	5.3
- 0.7	892	2.0	794	1.8
- 0.8	475	1.1	877	2.0
- 0.9	3869	8.7	2852	6.4
- 1.0	4865	10.9	4223	9.5
Total	44676	100.0	44676	100.0

Source: Authors' data base B (See Appendix).
Note: HHI is the Herfindahl-Hirschman index.
1-E/logN is the standardized entropy index.

Table 14

Distribution of Product Groups and Output
According to the Degree of Competition

	Product Groups		Output	
	Number	%	Mln levs	%
Pure Monopoly	430	41.0	3363	7.5
Dominant Firm	284	27.1	12768	28.6
Tight Oligopoly	256	24.4	13127	29.4
Loose Oligopoly	67	6.4	11048	24.7
Monopolistic Competition	2	0.2	555	1.2
Pure Competition	10	1.0	3816	8.5
Total	1049	100.0	44676	100.0

Source: Authors' data base B (See Appendix).
Note: Market categories are defined in the text.

Table 15

Distribution of Product Groups According
to the Total Capital Outlay Necessary
for Establishing an Enterprise with MES

Mln Levs	MES 50%	MES Aver.50%
up to 1	393	382
- 5	317	309
- 10	117	126
- 50	170	178
above 50	52	55

Source: Authors' data base B (See Appendix).
Note: MES 50% is minimum efficient scale defined on the smallest plant in the group of establishments that produce 50% of production.
MES Aver 50% is minimum efficient scale defined as the average of the top 50% of establishments.

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